

II. SPECIFICATION AMENDMENTS

Please replace the paragraph/section beginning on page 1, lines 11-18,

A received radio signal has often been corrupted by noise and intersymbol interference caused by e.g. multipath propagation. The multipath propagation may be e.g. of a Rician type where there is one (direct) path with a strong received signal, and other (reflected) paths with smaller signal strength. The Rician type propagation is usual in satellite systems. Another type of multipath propagation is a Rayleigh fading channel, where the strength of the received signals from different paths are of the similar magnitude. The Rayleigh fading channels channels are typical in cellular communications systems with fixed base stations.

Page 1, lines 20-33,

A functional block known as the signal equalizer is often used in TDMA (Time Divisional Multiple Access) receivers for recovering transmitted data from a received signal. In CDMA receivers a rake receiver is used performing this function. Typical radio receivers that use a signal equalizers and Rake Rake receivers are mobile stations and base stations of cellular radio systems. A signal equalizer needs to know the impulse response of the radio channel for the equalization to be successful. The conventional way of performing channel estimation and signal equalization is to generate an estimate of the radio channel's impulse response (also known as the channel estimate for short), and to equalize the received transmission blocks by using the achieved equalization data. A rake receiver typically comprises a channel estimator for each rake finger for estimating a complex channel multiplier for each signal signal path to be corrected. An example of a

prior art solution for providing one rake finger in a WCDMA (Wideband Code Division Multiple Access) rake receiver is shown in Figure 1.

Page 2, lines 12-20,

The signal from the multiplier 110 is also led to an integrator 112 and further to a channel estimator 114. The channel estimator estimates the complex channel coefficient of the radiochannel using pilot signal information (or a training sequence in a TDMA receiver), and provides the channel estimate for removing the channel. The despread signal from the integrator 122 is then multiplied by the complex conjugate of the channel estimator output in order to remove the phase shift caused by the channel. The output includes the recovered data (the so-called hard decision output) and it may include some reliability information (soft decision output) associated with the recovered data.

Page 2, lines 27-31,

An article [1] "A Novel Pilot Symbol Assisted Coherent Detection Scheme for Rician Fading Channels" by T. Asahara, T. Kojima and M. Miyake, WPMC '98, pp. 236-239, 1998, presents an advanced prior art method for equalizing a radio channel. The method is developed for receivers in a satellite communication ~~systems~~ system, where the channels are of Rician type.

Page 3, lines 17-28,

In mobile station receivers the frequency offset may be detected and frequency of the local oscillator (RF oscillator or IF oscillator) signal can be controlled to remove the offset. However, in the prior art receivers there is no information available on the exact amount of the frequency offset. Another

problem is that the resolution of the oscillator frequency adjustment is usually too coarse for adequately compensating the frequency offset. In base station receivers it is not possible to adjust the local oscillator frequency, because the local oscillators are common for several channels, and the amount of doppler effect is usually different for signals that are received from different mobile stations. It would also be possible to use adaptive channel equalizers for compensating the frequency offset, but ~~this~~ these kind of equalizers require large amounts of memory and processing capacity, and therefore they would substantially increase the manufacturing costs of the receivers.